

# The mediating role of the metacognition, time perspectives and experiential avoidance on the relationship between childhood trauma and post-traumatic stress disorder symptoms

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## ABSTRACT

**Background:** The current study was designed to investigate the direct and indirect effects of the childhood trauma, metacognition, time perspectives and experiential avoidance in prediction of post-traumatic stress disorder (PTSD) symptoms.

**Methods:** Participants included 432 adult patients referred for treatment to psychological, psychiatric disorders clinics and medical clinics of Shiraz, Iran. They were exposed to a traumatic event according to criterion A in the Diagnostic and Statistical Manual of Mental Disorders fifth edition (DSM-V). Childhood Trauma Questionnaire (CTQ), Post-traumatic Checklist for DSM-5 (PCL-5), Zimbardo Time Perspective Inventory (ZTPI), Acceptance and Action Questionnaire – II (AAQ-II) and metacognitions questionnaire-30 (MCQ-30) all were applied for data collection.

**Results:** The results indicated that childhood trauma has a direct correlation with symptoms of PTSD, metacognition, and time perspectives, while it has an indirect correlation with experiential avoidance as well as symptoms of PTSD. Thus, metacognition and time perspectives play a mediating role between childhood trauma and experiential avoidance. In the same way, all three variables (metacognition, time perspectives, and experiential avoidance) play the same role between childhood trauma and symptoms of PTSD.

**Conclusions:** Altogether, results of this study were consistent with the metacognitive model as well as Time Perspective Theory for PTSD and emphasizes that childhood trauma, metacognition, time perspectives and experiential Avoidance are important in explanation of PTSD symptoms.

## El rol mediador de la metacognición, perspectivas de tiempo y evitación experiencial en la relación entre trauma infantil y síntomas de trastorno de estrés postraumático

**Antecedentes:** El presente estudio fue diseñado para investigar los efectos directos e indirectos del trauma en la infancia, metacognición, perspectivas de tiempo y evitación experiencial como predictores de síntomas de trastorno de estrés postraumático (TEPT).

**Metodo:** Los participantes incorporados fueron 432 pacientes adultos referidos para tratamiento psicológico, a las clínicas de trastornos psiquiátricos y médica de Shiraz, Iran. Ellos estuvieron expuestos a un evento traumático según el criterio A del Manual Diagnóstico y Estadístico para Trastornos Mentales, quinta edición (DSM-5). Para la recolección de la información se aplicaron el Cuestionario de Trauma Infantil (CTQ, por sus siglas en inglés), la lista de chequeo postraumática del DSM-5 (PCL-5), el Inventario de Perspectiva de Tiempo de Zimbardo (ZTPI, por sus siglas en inglés), el Cuestionario de Aceptación y Acción-II (AAQ-II) y el Cuestionario de metacogniciones-30 (MCQ-30).

**Resultados:** Los resultados indicaron que el trauma infantil tiene una correlación directa con síntomas de TEPT, metacognición y perspectivas de tiempo, mientras que tiene una correlación indirecta con evitación experiencial y síntomas TEPT. De esta manera, la metacognición y perspectivas de tiempo juegan un rol mediador entre trauma infantil y evitación experiencial. De la misma forma, las tres variables (metacognición, perspectivas de tiempo y evitación experiencial) juegan el mismo rol entre trauma infantil y síntomas de TEPT.

**Conclusiones:** En conjunto, los resultados de este estudio fueron consistentes con el modelo metacognitivo 25, así como la teoría de la perspectiva del tiempo para el TEPT y enfatiza que el trauma infantil, la metacognición, las perspectivas de tiempo y la evitación experiencial son importantes en la explicación de los síntomas de TEPT.

## 元认知、时间洞察力和经验性回避对童年创伤与创伤后应激障碍症状之间关系的中介作用

**背景:** 目前的研究旨在调查童年创伤, 元认知, 时间洞察力和经验性回避在预测创伤后应激障碍 (PTSD) 症状中的直接和间接影响。

**方法:** 被试包括432名成年患者, 他们被转介到位于伊朗Shiraz的心理/精神障碍诊所和医疗诊所接受治疗。根据精神疾病诊断和统计手册第五版 (DSM-V), 他们曾暴露于标准A

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## PALABRAS CLAVE

Trauma infantil; Metacognición; perspectivas de tiempo; evitación experiencial; síntomas de TEPT

## 关键词

童年创伤; 元认知; 时间洞察力; 经验性回避; PTSD症状

## HIGHLIGHTS

- The childhood trauma is directly associated with metacognition, time perspective and PTSD symptoms.
- Metacognition, time perspective and experiential avoidance are directly associated with PTSD symptoms.
- The childhood trauma is indirectly associated with and PTSD symptoms through metacognition, time perspective and experiential avoidance.

创伤事件。童年创伤问卷 (CTQ), DSM-5的创伤后检查表 (PCL-5), 津巴多时间透视清单 (ZTPI), 接受和行动问卷-II (AAQ-II) 和元认知调查表 (MCQ-30) 被用于数据收集。

**结果:** 结果表明童年创伤与PTSD症状、元认知和时间洞察力直接相关, 而与经验性回避和PTSD症状间接相关。因此, 元认知和时间洞察力在童年创伤和经验性回避之间起着中介作用。同样, 所有三个变量 (元认知, 时间观点和经验性回避) 在童年创伤和创伤后应激障碍症状之间起着相同的作用。

**结论:** 总的来说, 本研究的结果与创伤后应激障碍的元认知模型和时间洞察力理论一致, 并强调童年创伤、元认知、时间洞察力和经验性回避对解释创伤后应激障碍症状的重要性。

## 1. Introduction

Childhood trauma, including abuse (sexual, emotional, and physical), and neglect (physical and emotional), is one of the most reliable predictors of post-traumatic stress disorder (PTSD) symptoms, which are characterized by re-experiencing, avoidance, negative cognitions and mood, and arousal following exposure to a stressor (American Psychiatric Association, 2013). Literature reviews (Dar, Wani, Margoob, Haq, & Chandel, 2015; Dvir, Ford, Hill, & Frazier, 2014; Li & Seng, 2018; Messman-Moore & Bhuptani, 2017), meta-analyses (Malarbi, Abu-Rayya, Muscara, & Stargatt, 2017; Tang, Deng, Glik, Dong, & Zhang, 2017) as well as longitudinal studies (Shenk, Putnam, Rausch, Peugh, & Noll, 2014; Steine et al., 2017) and cross-cultural studies (Kratzer et al., 2018; Vang, Shevlin, Karatzias, Fyvie, & Hyland, 2018) have all shown a direct association between childhood trauma and PTSD. However, not all childhood trauma contribute to PTSD or PTSD symptoms (Copeland, Keeler, Angold, & Costello, 2007; Paolucci, Genius, & Violato, 2001), suggesting that possible mediators may elucidate how childhood trauma leads to PTSD symptoms, but the causal mechanisms between childhood trauma and the progress of PTSD symptoms have not been sufficiently studied. The mediating variables for the relationship between childhood trauma and PTSD are various but there are a limited number of studies on the elaboration of this relationship.

In this regard, one of the models that can be used to explain the mechanisms of the formation and persistence of PTSD and its association with childhood trauma is the metacognitive model. According to the metacognitive model, the activation of the Cognitive-Attentional Syndrome (CAS) is considered to be the main cause for the development of the psychological disorders (Wells, 2000), CAS consists of behaviours such as rumination or worry, attentional focus on external and internal threat, and coping strategies such as avoidance and thought suppression. The CAS is considered to be derived from negative and/or positive metacognitive beliefs (Wells, 2009). The metacognitive beliefs are formed in childhood and adolescence (e.g. Schneider, 2008) and even some implicit metacognitions are developed

in infancy (Brinck & Liljenfors, 2013). Thus, it seems reasonable that metacognitive beliefs related to psychological disorders might also form early, so that early traumatic experiences such as neglect and abuse may cause the formation of positive and negative metacognitive beliefs and CAS activation, in a way that the child tries to avoid the trauma-related experiences (Myers & Wells, 2015). Regarding the consideration of the metacognitive model for study on PTSD, path analysis and structural equation model studies have shown the desirable fitness of the model with field data. These studies showed that the components of the CAS, namely, worry (Roussis & Wells, 2006), rumination (Bennett & Wells, 2010), strategies of emotion regulation (Mazloom, Yaghubi, & Mohammadkhani, 2016) and avoidance coping strategies (Pietrzak, Harpaz-Rotem, & Southwick, 2011) have a mediating role in relationship between metacognitive beliefs and PTSD symptom.

As mentioned earlier, early traumatic events lead to the formation of negative metacognitive beliefs and activation of the CAS, which in turn increases the likelihood of experiencing PTSD symptoms. According to the metacognitive model, emotion regulation is one of the CAS facets that influences on metacognition and as a result of this effect, the psychological disorders are developed (Leahy, Tirsch, & Napolitano, 2011). Recent studies have shown that among emotion regulation aspects, experiential avoidance, rumination, and thought suppression have highest relationship with PTSD symptoms (Seligowski, Lee, Bardeen, & Orcutt, 2015). Experiential avoidance is conceptualized as an unwillingness to experience the painful or aversive internal events (e.g. thoughts, emotions, and/or physical sensations), and it includes attempts to change their frequency or nature (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). Experiential avoidance may play a predominantly important role in the progress of PTSD symptoms in people who have experienced the abuse or neglect (Shenk, Putnam, & Noll, 2012). Childhood trauma is associated with higher levels of experiential avoidance (Gratz, Bornoalova, Delany-Brumsey, Nick, & Lejuez, 2007; Shenk et al., 2012) upon which this relationship has predicted the

increase in the progress of PTSD symptoms (Plumb, Orsillo, & Luterek, 2004).

Time perspectives can be considered as another conceptualization applied recently for study on PTSD, and a few studies have been conducted to apply a therapeutic model based on this conceptualization to treat PTSD, and it may be regarded as a significant link between childhood trauma and PTSD symptoms. According to time perspective theory (Zimbardo & Boyd, 2008), time perspective is a concept referring to how the separable time zones influence one's behaviour and how one adjusts to the changes. TP consists of cognitive processes and perceptions of temporal categories (past, present, and future), each of these frames is dividable into sub-categories: past-positive, past-negative, present-hedonistic, present-fatalistic, future, and transcendental future. Past-positive category describes 'a warm, sentimental attitude towards the past,' whereas the past-negative category refers to 'a generally negative, aversive view of the past'. Present-hedonistic category refers to 'a reflection of a hedonistic, risk-taking devil that may care attitude towards time and life,' however; present-fatalistic category refers to 'a fatalistic, helpless, and hopeless attitude towards the future and life'. Finally,; transcendental future category refers to an individual's general orientation of the future (Zimbardo & Boyd, 1999). Individuals develop the temporal biases towards frames that lead to the overuse or underuse of one or more of time frames when attempting to make action-based decisions. It is best to improve a balanced time orientation corresponding to these flexible TP to be adjusted based on the current and changing situational demands (Zimbardo, Sword, & Sword, 2012), so that individuals develop a high past-positive, a moderate level of present-hedonistic and future, and low level of past-negative and present-fatalistic (Zimbardo & Boyd, 1999, 2008).

People with PTSD generally do not pay attention or consider the future, particularly they do not think about a positive future, they are restricted in a pattern of re-experience of past-negative events and they are unable to live in the moment to enjoy it (Sword, Sword, Brunskill, & Zimbardo, 2014). Brown et al. (2013) showed that people with PTSD show same defects at the time of occurrence of the personal past and future events that it may be an untested mechanism involving in the maintenance and development of PTSD symptoms. Therefore, it appears that an inflexible, negative and narrowed perspective is common in people with PTSD (Stolarski & Cyniak-Cieciura, 2016). According to the conceptualization of TP by Zimbardo, people who have experienced abuse or neglect in childhood are likely to have a negative perspective towards the past and a fatalistic perspective towards the present so that they are more focused on past events and they believe that they cannot influence in the course of their life. The TP

influences coping strategies so that people, who have a negative perspective towards the past and fatalistic perspective about the present, use avoidance strategies to cope with the negative emotions (Zimbardo & Boyd, 1999, 2008). But there is no study regarding the empirical investigation of the hypothetical role of TP on the relationship between childhood trauma and PTSD so far.

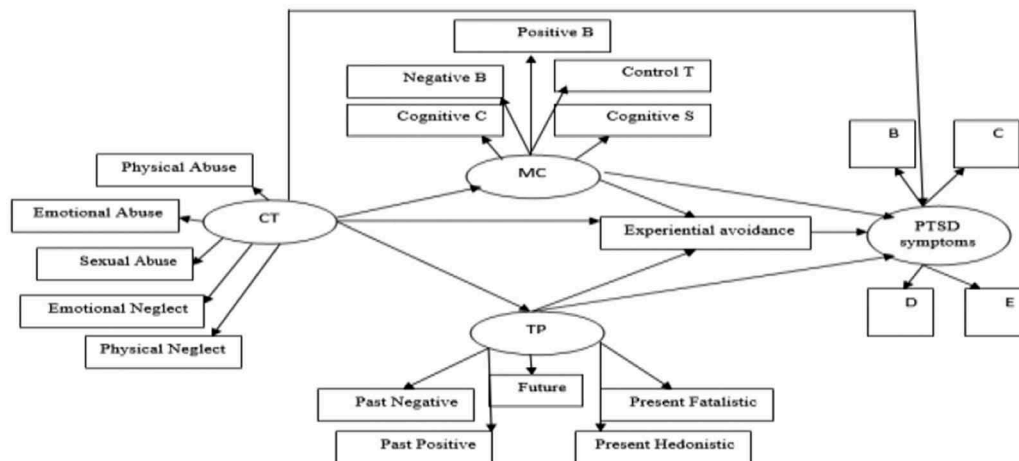
### 1.1. The current study

In summary, metacognitive model for study on PTSD is known as a model with desirable fitness, but studies are limited to the investigation on rumination and worry and the factor of experiential avoidance has been neglected in the studies, and there is a little knowledge on the situational factors (such as childhood trauma) influencing the development of the dysfunctional metacognitions (Myers & Wells, 2015). Moreover, unlike a growing number of studies showing a relationship between childhood trauma and PTSD symptom, the precise nature of this relationship is unclear. Thus, as the first goal, we investigated the fitness of the metacognitive model for PTSD and added two variables (childhood trauma and experiential avoidance) in this model to elucidate the role of childhood trauma in metacognitive model for PTSD. We assumed that childhood trauma is involved in the PTSD symptoms through metacognition and experiential avoidance, so that childhood trauma has direct and indirect effects (metacognitions) and metacognition has direct and indirect effects (through experiential avoidance). Also, considering that time perspective therapy (TPT) is a new time-based intervention developed for treating the patients diagnosed with PTSD (Sword et al., 2014), but the research on the association between time perspectives and PTSD symptoms and mechanisms mediating this relationship is scarce, thus in order to empirically investigate the association and the mediating mechanisms, and based on the Temporal Theory proposed by Zimbardo (Zimbardo & Boyd, 2008), we hypothesized that childhood trauma is involved in the PTSD symptoms through time perspectives and experiential avoidance, so that childhood trauma has direct and indirect effects (time perspective) and time perspectives have direct and indirect effects (through experiential avoidance). The proposed model is shown in Figure 1.

## 2. Method

### 2.1. Participants and procedures

This study has a descriptive-cross-sectional design. Participants included 432 (278 women and 154 men) adult patients who referred for treatment to the psychological and psychiatric disorders clinics and medical clinics of Shiraz, Iran, and they all spoke Persian. In these centres, relevant physicians,



**Figure 1.** Proposed model.

CT: Childhood Trauma; MC: Metacognition; Positive B: Positive Beliefs about worry; Negative B: Negative Beliefs about the uncontrollability worry and danger; Cognitive C: Cognitive Confidence; Cognitive S: Cognitive Self-Consciousness; TP: Time Perspectives; B: Intrusions; C: Avoidance; D: Negative alterations in cognition and mood; E: Alterations in arousal

psychologists, counsellors, or social workers explained the study criteria and they introduced the perfect candidates for the study purposes, with all of them had agreeing to participate. Finally, the researchers conducted clinical interviews to ensure having relevant experience of traumatic events and meeting the study criteria by the participants. Inclusion criteria included having at least 18 years of age, having consent to participate and a history of the exposure to a traumatic event according to criterion A in the Diagnostic and Statistical Manual of Mental Disorders fifth edition (DSM-V; American Psychiatric Association, 2013) and meeting at least one another criteria in addition to criterion A in the DSM-V for the diagnosis of PTSD. A total of 140 participants out of all 432 (32.4%) proved to have symptoms of PTSD according to the DSM-5 criteria. The 32.4% having a probable diagnosis of PTSD in the present study is higher than the 3.8% to 8.3% found in the general population (Kilpatrick et al., 2013). In explaining this higher incidence compared to a study by Kilpatrick et al. (2013), we can refer to a stringent criterion for selection of 432 primary participants, so that the inclusion criterion for selection of individuals in the sample group ( $n = 432$ ) was that they had to have at least two criteria for diagnostic criteria of DSM-5 for the PTSD. In other words, people who had the only traumatic experience and no other diagnostic criterion for the PTSD, were not included in the study.

The time interval from the exposure to a traumatic event to the time for the conduction of the study was from 1 to 24 months. Regarding the traumatic events, most of the participants confirmed experiencing a serious accident with motor vehicle ( $n = 172$ , 41.05%), experiencing a life-threatening illness/injury ( $n = 123$ ,

29.35%), exposure to a natural disaster ( $n = 104$ , 24.82%), other traumatic events included sexual assault ( $n = 12$ , 2.86%), and combat ( $n = 8$ , 1.9%). Out of the 432 initial participants, 13 individuals were excluded due to incomplete data. Age of the participants ranged from 18 to 58 years old ( $M = 32.50$ ,  $SD = 9.32$ ).

The study (including a survey on participants with questionnaires) was conducted by PhD students of psychology, under the supervision of their professors. This study has been approved in the ethics committee of Shiraz University of Medical Sciences, with codes of ethics IR.SUMS.REC.1397.906. The aim of the study was explained for all participants and the informed consent was obtained from all participants before participation in the study and APA's Ethical Principles of Psychologists were firmly followed in the research work.

In this study, the Persian version of the questionnaires has been used, with their psychometric characteristics reviewed and approved in Iran. These questionnaires were firstly translated into Persian by a psychological expert and a professional translator. Then, they were translated again to English to allow for comprehensive comparison with the original copy for necessary modifications. These questionnaires were initially distributed among a sample group which was similar to the target population to make the ultimate revisions. Finally, the questionnaires were subjected to an assessment in regard to psychometric characteristics.

## 2.2. Measures

### 2.2.1. The childhood trauma questionnaire (CTQ)

CTQ (Bernstein et al., 2003) is a 25-item questionnaire that evaluates the experience of the various

types of childhood trauma. The questionnaire includes five subscales, abuse (physical, emotional and sexual) and neglect (emotional and physical). Items are valued from 1 to 5 (never true = 1; very often true = 5). The reliability, divergent, predictive and convergent validity of CTQ have been verified in both subclinical and clinical populations and they are reported to be in excellent situation (Brodsky et al., 2008). In this study, the Persian version of CTQ was administered, and internal consistency with an alpha coefficient for each scale was reported ranging from good to excellent: emotional neglect  $\alpha = .91$ , physical neglect  $\alpha = .77$ , emotional abuse  $\alpha = .89$ , physical abuse  $\alpha = .93$ , sexual abuse  $\alpha = .87$ .

### 2.2.2. The post-traumatic checklist for DSM-5 (PCL-5)

PCL-5 (Weathers et al., 2013) measures PTSD symptoms in the past month according to the DSM-5 criteria. It includes four subscales: intrusions (5 items), avoidance (2 items), negative alterations in cognition and mood (7 items), and alterations in arousal (6 items) that is valued from 0 to 4 (not at all = 0; Extremely = 4), and the total score for the PCL-5 ranges from 0 to 80. Studies have reported the acceptable internal consistency, test-retest reliability, and convergent and discriminant validity have been confirmed in different populations (Blevins, Weathers, Davis, Witte, & Domino, 2015). In this study, the Persian version of PCL-5 was implemented, and internal consistency of the scale was excellent,  $\alpha = 0.92$ .

### 2.2.3. Zimbardo time perspective inventory (ZTPI)

The short version of the ZTPI (Zimbardo & Boyd, 1999) includes 36 items ranging from 1 to 5 (very untrue = 1; very true = 5). This inventory assesses the perception of a person's past, present, and future. Past is divided into 'Past-Negative' and 'Past-Positive', Present is divided into 'Present-Fatalistic' and 'Present-Hedonistic', whereas Future consists of one single facet. A higher score in the Past-Negative facet represents a negative perspective towards the past, while a higher score in the Past-Positive facet indicates a lack of a positive perspective towards the past, also a higher score in the Present-Fatalistic facet represents a fatalistic perspective towards the present, while a higher score in the Present-Hedonistic facet indicates a lack of a hedonistic perspective towards the present and finally a higher score in the Future facet indicates a lack of a perspective towards the future. Thus, the higher score in all five facets represents a negative perspective. The validity and reliability of the short version of the ZTPI has reported to be acceptable in the Iranian setting (Alizadeh Fard, Mohtashami, Haghghatgoo, & Zimbardo, 2017). In this study, the Persian version of ZTPI was administered and internal consistency with an alpha

coefficient for each subscale was reported ranging from good to excellent: Past-Negative  $\alpha = .94$ , Past-Positive  $\alpha = .93$ , Present-Fatalistic  $\alpha = .76$ , Present-Hedonistic  $\alpha = .94$ , Future  $\alpha = .79$ .

## 2.3. The acceptance and action questionnaire - II (AAQ-II)

AAQ-II (Bond et al., 2011) includes 10 items that measures the experiential avoidance in a 7-point Likert scale ranging from 1 to 7 (never true = 1; always true = 7). In this scale, higher scores indicate greater experiential avoidance. In this study, the Persian version of AAQ-II was administered and alpha coefficient was reported to be at .88.

### 2.3.1. The metacognitions questionnaire-30 (MCQ-30)

MCQ-30 is a 30-item scale that measures metacognitive beliefs and processes. It includes five subscales: (i) positive beliefs about worry, (ii) negative beliefs about the uncontrollability and danger of worry, (iii) beliefs about the need to control thoughts, (iv) Cognitive uncertainty and (v) cognitive self-consciousness (Wells & Cartwright-Hatton, 2004). The scale for each item ranged from 1 (do not agree) to 4 (agree very much). In this study, the Persian version of MCQ-30 was administered and internal consistency with an alpha coefficient for each subscale was reported to be excellent from .83 to .89.

### 2.3.2. Statistical analyses

In order to investigate the basic relationship between variables, Pearson correlation test was used to test the relationship between the variables in SPSS software version 23.0. Due to the existence of latent variables (e.g. childhood trauma, metacognitions, time perspectives and post-traumatic stress symptoms) and their indirect effects, the mediational hypotheses were investigated using structural equation modelling (SEM) in AMOS software version 22.0. Mediation was considered using bootstrapping procedures. In this study, to evaluate the desirable fitness of the indices, the criteria presented by Kline (2005), Browne and Cudeck (1993) Hu and Bentler (1999) were utilized. They consider the CFI (Comparative fit index), IFI (Incremental Fit Index), NFI (normed fit index), GFI (Goodness of fit index) and TLI (Tucker-Lewis index) equal or larger than 0.90 and RMSEA (root mean squared error of approximation) lower than 0.08 as the index of desired fitness of the model.

Also, in relation to the measurement model, it should be noted that the measurement model refers to the factor loadings of the indicators observed for each latent variable. The basic logic in measurement model test is that if we do not have enough trust in indicators in terms of construct representativeness,

there is no reason to use them for the theoretical pattern test. In the current research, PTSD symptoms included 20 items and 4 components, metacognitions with 30 items and 5 components, experiential avoidance with 10 items, time perspectives with 36 items and 5 components and finally the childhood trauma with 25 items and 5 components. In the structural equation modelling, when the indicators of one latent variable are relatively high, especially when 5 to 8 items are loaded on each factor, importing all indicators of latent variables into the model will increase the number of parameters. As the number of parameters increases, it becomes statistically harder to accurately estimate parameters causing rejection of proper models. To deal with this problem, psychometric experts and statisticians suggest to use parceling techniques. In this regard, it is either required to merge the components together and putting in subscales or to categorize them under item parcels based on their load factor. For the variables which have components such as childhood trauma, metacognition, and time perspective, the method of merging components was used where the components were summed up and presented as subscales. For the experiential avoidance, two item parcels were presented as items were composite to each other. In this way, the number of indicators and eventually the number of estimated parameters were reduced which also improved the fitting of the model to the data (Floyd & Widaman, 1995; Kishton & Widaman, 1994; Rogers & Schmitt, 2004).

### 3. Results

Table 1 shows the mean and standard deviation of the variables in the model. Before implementing the model,

first it is necessary to investigate the correlation between the existing variables in the model. Table 1 also shows the correlation coefficients between the research variables.

Table 1 shows that the variables including childhood trauma, metacognitions, time perspectives, experiential avoidance and post-traumatic stress symptoms, all were positively correlated ( $p < .01$ ).

#### 3.1. Measurement model test

As explained in the Statistical analyses section, indicators of the latent variables (childhood trauma, metacognitions and time perspectives) were put within the subscale and the indicators of the experiential avoidance were presented within two-item parcelling. Table 2 shows that indicators of the latent variable, their factor loadings and their level of significance.

Table 2 shows that all factor loadings are significant at the level of 0.01 and difference in the factor loadings for the indicators of the latent variables is very low where such cases show the construct validity and convergent validity of the indicators. The fitness indices of this study show that the RMSEA, CFI, GFI, IFI, NFI, and TLI are equal to .06, .93, .90, .93, .92 and .90, respectively. This indicates the desired fitness of the measurement model. Also, confirmatory factor analyses (CFA) for each questionnaire are as follows:

CFA of CTQ (CFI = .93, TLI = .88, IFI = .91, NFI = .90, GFI = .92 and RMSEA = .09); CFA of PCL-5 (CFI = .92, TLI = .90, IFI = .92, NFI = .91, GFI = .92 and RMSEA = .08); CFA of ZTPI (CFI = .91, TLI = .89, IFI = .91, NFI = .91, GFI = .92 and RMSEA = .06); CFA of MCQ-30 (CFI = .98, TLI = .97, IFI = .98, NFI = .98, GFI = .97 and RMSEA = .07); CFA of AAQ-II (CFI = .93, TLI = .88, IFI = .90, NFI = .91, GFI = .90 and RMSEA = .08).

**Table 1.** Descriptive statistics and correlation among model variables.

Variables	1	2	3	4	5	Mean	Standard deviation
1. PTSD symptoms	1					44.25	18.20
2. metacognitions	0.54**	1				74.35	20.40
3. experiential avoidance	0.58**	.052**	1			41.59	16.31
4. time perspectives	0.52**	0.49**	0.55**	1		129.99	30.1
5. childhood trauma	0.56**	0.63**	0.49**	0.51**	1	64.10	22.53

\*\* $p < 0.01$ ;  $N = 419$ .

**Table 2.** The factor loads and significant level of markers.

Latent variables	Indicators	Factor loads	Latent variables	Indicators	Factor loads
PTSD symptoms	Intrusions	0.78**	Experiential avoidance	Item parcel 1	0.95**
	Avoidance	0.74**		Item parcel 2	0.93**
	Negative alterations in cognition and mood	0.84**	Time perspectives	T. subscale1	0.79**
Metacognitions	Alterations in arousal	0.68**	Childhood trauma	T. subscale2	0.84**
				T. subscale3	0.72**
				C. subscale1	0.93**
	M.subscale1	0.87**		C. subscale2	0.91**
	M.subscale2	0.98**			
	M.subscale3	0.96**			

M.subscale1: positive and negative beliefs about worry and uncontrollability and danger of worry; M.subscale2: cognitive uncertainty and cognitive self-consciousness; M.subscale3: beliefs about the need to control thoughts; T. subscale1: Positive and negative past perspective; T. subscale2: Fatalistic and hedonistic present perspective; T. subscale3: Future perspective; C. subscale1: Physical, sexual and emotional abuse; C. subscale2: Physical and emotional neglect.

### 3.2. Structural model test

Initial implementation of the model showed that the fitness indices are desired (CFI = .92, TLI = .90, IFI = .92, NFI = .91, GFI = .90 and RMSEA = .07) and all direct and indirect coefficients are significant at the alpha level of .01, except the effect for direct coefficient of childhood trauma on experiential avoidance ( $\beta = .07, t = 1.63, p = .10$ ) which was not identified to be significant.

Lomax and Schumacker (2012) explained that ‘if insignificant paths are diagnosed in the estimated model, the next stage is to correct the model followed by the evaluation of the modified model’. Therefore, the direct effect of childhood trauma on the experiential avoidance was omitted and then, the research hypotheses were investigated. Figure 2 shows the path direct coefficients, factor loadings and error value. Table 3 also shows the path indirect coefficients, and the significance level of the coefficients.

Figure 2 and Table 3 show that a number of hypotheses are confirmed at the alpha level of .01 and the others are confirmed at the alpha level of .05. Such that childhood trauma has direct and indirect effects (through metacognition) and metacognition has direct and indirect effects (through experiential avoidance) on PTSD symptoms. Also, childhood trauma has direct and indirect effects (through time perspective) and time perspectives can have direct and indirect effects (through experiential avoidance) on PTSD symptoms.

The index showed a desire fit (CFI = .93, TLI = .91, IFI = .93, NFI = .92, GFI = .91, and RMSEA = .06).

### 4. Discussion

Fitness indices revealed that the proposed model has an acceptable fitness. Consistent with initial assumption of this study and the PTSD metacognitive model (Wells, 2009), the results suggested that childhood trauma has a direct correlation with metacognition and symptoms of PTSD, while metacognition has a direct correlation with experiential avoidance and symptoms of PTSD. These findings have been consistent with the results of previous research (Myers & Wells, 2015; Scarpa, Wilson, Wells, Patriquin, & Tanaka, 2009; Vang et al., 2018; Westphal, Leahy, Pala, & Wupperman, 2016). Indirect impacts assessment also indicated that metacognition and experiential avoidance can be considered as a mediator between childhood trauma and symptoms of PTSD. This fact has already been found by several previous studies (Mazloom et al., 2016; Myers & Wells, 2015; Shenk et al., 2012).

Nevertheless, the question remains why childhood trauma (physical, sexual and emotional abuses and emotional and physical neglecting) is correlated with the development of inefficient metacognition and symptoms of PTSD. It seems that when a child experiences a traumatic event, he/she seeks a safe condition provided by his/her emotionally supportive caregivers. This helps developing positive self-regulation strategies after experiencing the traumatic event. In the absence of the effective supports such as in the case of abusive or negligent supporters, the child starts to develop positive thoughts about the worry and threatening

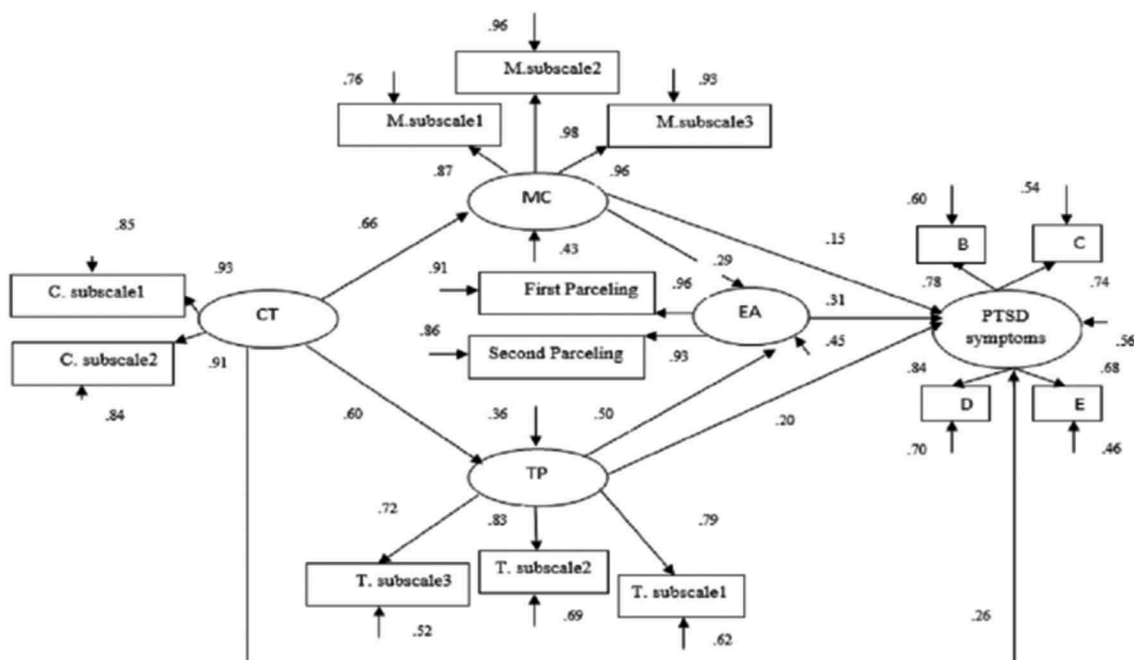


Figure 2. The modified model for PTSD symptoms.

M.subscale1: positive and negative beliefs about worry and uncontrollability and danger of worry; M.subscale2: cognitive uncertainty and cognitive self-consciousness; M.subscale3: beliefs about the need to control thoughts; T.subscale1: Positive and negative past perspective; T.subscale2: Fatalistic and hedonistic present perspective; T.subscale3: Future perspective; C.subscale1: Physical, sexual and emotional abuse; C.subscale2: Physical and emotional neglect.

**Table 3.** The indirect effects of all paths through bootstrapping for the modified model.

Paths	Unstandardized coefficients	Standardized coefficients	<i>p</i> value	Bootstrap 95% CI	
				Lower bound	Upper bound
CT→MC and TP→EA	0.29	0.49	0.023	0.24	0.33
CT →MC, TP and EA→ PTSD	0.13	0.36	0.008	0.10	0.17
TP→EA→PTSD	0.12	0.15	0.008	0.07	0.24
MC→EA→PTSD	0.09	0.09	0.014	0.05	0.18

CT: childhood trauma; MC: metacognitions; TP: time perspective; EA: experiential avoidance.

cases to prevent further abuses and misbehaviours (Myers & Wells, 2015). Frequent experiences of worry and its consequences form meta-worry or negative metacognitive beliefs about the worry such as uncontrollable thoughts and threats (Wells, 2009). Based on metacognition perspective, people generally use negative strategies such as experiential avoidance to regulate emotions when facing meta-worry. These strategies develop a kind of personal processing focused on the threat such that it preserves worry or feel of threat which does not facilitate the feeling of safety and normal situation (Bennett & Wells, 2010). Use of experiential avoidance as a long-term strategy limits the positive experience of psychological events and prevents access to inner important information. According to the results of prior studies, people with PTSD show more self-blame and self-criticism in comparison with normal people (Kline, Berke, Rhodes, Steenkamp, & Litz, 2018). Experiential avoidance also increases blaming and critical responses to personal experiences (thoughts, feelings, and unwanted imagination) as it prevents validation. Validation makes patient's feeling to seem unexceptional and the need for expressing emotions does not eventuate to failure. Validation also reduces the feel of shame and guilt and helps the patients to accept their feelings. As a result, it is correct to presume that validation changes emotional beliefs and even the emotion itself. Hence, it sounds logical to expect a positive correlation between experiential avoidance and increased chance of experiencing symptoms of PTSD (Leahy et al., 2011; Shenk et al., 2012). The mediating role of metacognition and experiential avoidance in the relationship of childhood trauma and symptoms of PTSD can be one the reasons why no symptoms of PTSD are observed in all adult people with an experience of childhood trauma.

The evaluation of the second hypothesis suggested that according to this hypothesis and Zimbardo's concept of time perspective for PTSD (Sword et al., 2014), childhood trauma has a direct correlation with time perspective as well as symptoms of PTSD. Time perspective has also a direct correlation with symptoms of PTSD as well as experiential avoidance. The evaluation of indirect effects has also revealed that time perspective and experiential avoidance could be a mediator between childhood trauma and symptoms of PTSD. Although we are at the first stages of understanding the relationship between childhood trauma,

time perspective, and symptoms of PTSD and there are limited numbers of studies conducted in this field, these findings approve previous research results (Brown et al., 2013; Stolarski & Cyniak-Cieciura, 2016; Sword et al., 2014).

Based on the Bowlby's theory of attachment, formation of an attachment can function as a safe shelter against psychological pathology and provides the possibility of successful development of emotions (Lowell, Renk, & Adgate, 2014). This is the reason why the bitter experiences of the past, especially those caused by the caregivers, have a determining effect on the persons' thoughts, emotions, and behaviours about themselves and others, reflecting itself in giving order, coherence, and meaning of the events. Meanwhile, time perspective involves cognitive processes that help to give order, coherence, and meaning to those events (Stolarski & Cyniak-Cieciura, 2016). Therefore, it is expected to observe a correlation between childhood trauma and the time perspective a person has. Zimbardo's concept of time perspective claims that pathological time perspective occurs when a person is trapped in one specific timeframe and is not able to move flexibly between different timeframes. This can be an explanation of the correlation between time perspective and experiential avoidance or eventually symptoms of PTSD (Sword et al., 2014). Based on this concept, people who have been refused or abused in childhood are most likely to have negative perspective towards their past as they seem to be trapped in the same time pattern of experiencing that event again and again. They have fatalistic view towards the life and consider themselves unable to change their life while experiencing the feelings of frustration and helplessness seeing no reason to try for a happy and joyful life. These people do not consider the future at all as they cannot have a future perspective. This kind of time perspective has an impact on their coping strategies such that people with a negative time perspective towards the past and fatalistic views towards the present time use negative emotional strategies such as experiential avoidance for coping with negative emotions (Stolarski, Fieulaine, & van Beek, 2015). Note that experiential avoidance itself has a positive correlation with symptoms of PTSD.

Overall, the present study further clarifies and extends the researches regarding the metacognitive model of PTSD and provides a preliminary support for the role of time perspectives as an underlying



mechanism in the relationship between childhood trauma and PTSD symptoms. This study results suggest that further research is needed to replicate these preliminary findings and to determine how childhood trauma, metacognitions, time perspective, and experiential avoidance are related to adult PTSD symptoms.

There are several limitations which must be noted while interpreting the conclusions of the present study. Our data were cross-sectional in type which was obtained by the correlational analysis and dependence on the retrospective self-report instruments. Additionally, the generalizability of the study results may be limited due to restricting the type of participants to the treatment-seeking sample. It is suggested to investigate the proposed model in longitudinal studies and to employ the clinical sample in compare subclinical sample.

Parcelling techniques are used in this study for data analysis. These techniques have several limitations, however. For example, once different items and components are composite, it is not possible to estimate errors separately which can reduce the accuracy of the results or cause some deviations (even negligible ones) in the results.

## Disclosure statement

No potential conflict of interest was reported by the authors.

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